

attorney's fees, and it contains no exception to the American Rule. In order to collect, [the plaintiff] must look to [the] EAJA. . . ."). Because it erroneously awarded fees under the ESA, the trial court did not address the possibility of an award of fees under the EAJA. Accordingly, this court vacates the trial court's award of attorney fees and remands to that court for a determination of whether an award of fees under the EAJA would be appropriate.

## IV.

Because the Court of International Trade lacked the requisite jurisdiction, this court vacates the trial court's October 8, 1996 and November 25, 1996 orders. Because the ESA cannot form the basis for Earth Island's suit, this court vacates the trial court's award of attorney fees and remands for a determination of whether an award of fees under the EAJA would be appropriate.

## COSTS

Each party shall bear its own costs.

VACATED and REMANDED.



ROCKWELL INTERNATIONAL  
CORPORATION, Plaintiff-  
Appellant,

v.

The UNITED STATES, Defendant-  
Appellee.

and

SDL, Inc., Third Party Defendant/Cross-  
Appellant.

Nos. 97-5065, 97-5068.

United States Court of Appeals,  
Federal Circuit.

June 15, 1998.

Patentee brought action against the United States, alleging that government's procurements of various items infringed its patent for method of making semiconductor material by chemical vapor deposition (CVD)

process, and contractor who participated in procurements was permitted to intervene. The United States Court of Federal Claims, Kenneth R. Harkins, J., 37 Fed.Cl. 478, granted summary judgment for defendants, holding patent invalid for obviousness. Patentee appealed, and contractor cross-appealed. The Court of Appeals, Michel, Circuit Judge, held that: (1) district court properly defined term "cold-wall reactor"; (2) material fact issues existed as to claim that patent was anticipated; (3) material fact issues existed as to claim that patent was obvious; and (4) lower court improperly drew inferences against patentee on summary judgment.

Affirmed in part, vacated in part, and remanded in part.

## 1. Federal Courts ⇨1120

In determining the propriety of summary judgment, credibility determinations may not be made, and the evidence must be viewed favorably to the nonmovant, with doubts resolved and reasonable inferences drawn in the nonmovant's favor. RCFC, Rule 56(c), 28 U.S.C.A.

## 2. Federal Courts ⇨1120

In rendering a decision on a motion for summary judgment, a court must view the evidence presented through the prism of the substantive evidentiary burden that would inhere at trial, and moving party bears the burden of demonstrating the absence of genuine issues of material fact. RCFC, Rule 56(c), 28 U.S.C.A.

## 3. Patents ⇨324.5

Although Court of Appeals reviews de novo trial court's grant of summary judgment, in patent infringement action, underlying determination of patent invalidity must be predicated on facts established by clear and convincing evidence.

## 4. Patents ⇨16(2), 16.5(1), 36.1(1)

Obviousness of patent claim is question of law based on underlying factual determinations including (1) scope and content of the prior art; (2) level of ordinary skill in the art; (3) differences between claimed invention and prior art; and (4) extent of any proffered objective indicia of nonobviousness, some-

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contractor who participated in was permitted to intervene. ates Court of Federal Claims, arkins, J., 37 Fed.Cl. 478, ary judgment for defendants, invalid for obviousness. Patent and contractor cross-appealed. ppeals, Michel, Circuit Judge, istrict court properly defined reactor"; (2) material fact as to claim that patent was material fact issues existed as patent was obvious; and (4) nproperly drew inferences on summary judgment.

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#### ts ⇨1120

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a decision on a motion for nt, a court must view the d through the prism of the ntary burden that would d moving party bears the trating the absence of gen- terial fact. RCFC, Rule

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rt of Appeals reviews de grant of summary judg- ingement action, underly- of patent invalidity must facts established by clear lence.

#### s. 16.5(1), 36.1(1)

patent claim is question nderlying factual determi- ) scope and content of the f ordinary skill in the art; een claimed invention and extent of any proffered f nonobviousness, some-

times termed secondary considerations. 35 U.S.C.A. § 103(a).

#### 5. Patents ⇨324.5

In reviewing summary judgment determination that patent claim is obvious, Court of Appeals first determines anew whether record raises any genuine issues of material fact, and, if facts remain in dispute, Court weighs materiality of dispute, that is, whether resolution of dispute one way or the other makes a difference to the final determination of obviousness. 35 U.S.C.A. § 103(a).

#### 6. Patents ⇨314(5), 324.5

First step in any patent invalidity or infringement analysis is claim construction, which is question of law, reviewed de novo on appeal.

#### 7. Patents ⇨101(1)

When the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects.

#### 8. Patents ⇨101(2)

For purpose of patent claiming method of making semiconductor material by chemical vapor deposition (CVD) process, district court properly defined term "cold-wall reactor" as one in which heat is applied at substrate, and walls are kept significantly cooler than substrate, not as reactor in which walls of reaction chamber are kept cool enough to avoid significant pyrolysis of reactants on or near walls of reactor.

#### 9. Patents ⇨51(1)

To invalidate patent, anticipation requires disclosure in a single piece of prior art of each and every limitation of a claimed invention. 35 U.S.C.A. § 102.

#### 10. Patents ⇨314(5)

Whether prior art anticipates patent is question of fact.

#### 11. Patents ⇨323.2(3)

Material issues of fact as to whether any single prior art reference taught successful process for growth of epitaxial film using organometallics precluded summary judgment for alleged infringers of patent on grounds that patent for method of making semiconductor material by chemical vapor

deposition (CVD) process was anticipated by prior art. 35 U.S.C.A. § 102.

#### 12. Patents ⇨16(4)

In determining obviousness, the invention must be considered as a whole without the benefit of hindsight, and the patent claims must be considered in their entirety. 35 U.S.C.A. § 103(a).

#### 13. Patents ⇨112.3(2)

Throughout obviousness determination, patent retains its statutory presumption of validity, and movant retains burden to show invalidity of claims by clear and convincing evidence as to underlying facts. 35 U.S.C.A. §§ 103(a), 282.

#### 14. Patents ⇨323.2(3)

Material issues of fact as to whether any prior art or combination of prior art taught successful process for growth of single crystal film of Group III/V semiconductor material on substrate using organometallic reagents precluded summary judgment for alleged infringers of patent on grounds that patent for method of making semiconductor material by chemical vapor deposition (CVD) process was obvious. 35 U.S.C.A. § 103(a).

#### 15. Patents ⇨16.5(1)

That prior art patents may have described failed attempts or attempts that used different elements to achieve result claimed by patent is not enough to find patent obvious; rather, prior art must be enabling. 35 U.S.C.A. § 103(a).

#### 16. Patents ⇨323.2(4)

On alleged patent infringers' motion for summary judgment on grounds that patent was invalid for obviousness, drawing of inference, in favor of alleged infringers, that prior art, in combination, would have rendered claimed process obvious to one of ordinary skill in the art was improper, where court found that none of prior art patents taught claimed process. 35 U.S.C.A. § 103(a).

#### 17. Patents ⇨16(3)

Consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that process claimed by patent should be

carried out and would have a reasonable likelihood of success. 35 U.S.C.A. § 103(a).

#### 18. Patents $\Rightarrow$ 36.1(1)

Evidence of secondary considerations of nonobviousness is but part of totality of evidence that is used to reach ultimate conclusion that patent is obvious, and, in some cases, this evidence is the most probative of obviousness, although its existence or nonexistence does not control the obviousness determination. 35 U.S.C.A. § 103(a).

Richard S. Florsheim, Foley & Lardner, Milwaukee, WI, argued for plaintiff-appellant. With him on the brief were Bernhard D. Saxe and Larry L. Shatzer, II, Washington, DC.

John Fargo, Assistant Director, Commercial Litigation Branch, Civil Division, Department of Justice, Washington, DC, argued for defendant-appellee. With him on the brief were Frank W. Hunger, Assistant Attorney General, Vito J. DiPietro, Director, and Chun-I Chiang, Attorney.

Michael M. Carlson, Morrison & Foerster LLP, Palo Alto, CA, argued for third party defendant/cross-appellant. With him on the brief were Marc J. Pernick, Palo Alto, CA, and Preston Moore, San Francisco, CA.

Before NEWMAN, MICHEL and CLEVENGER, Circuit Judges.

MICHEL, Circuit Judge.

Rockwell International Corporation ("Rockwell") appeals the decision on summary judgment of the United States Court of Federal Claims in *Rockwell International Corp. v. United States*, 37 Fed. Cl. 478 (1997), holding all asserted claims of United States Patent No. 4,368,098 (the "'098 patent") invalid for obviousness under 35 U.S.C. § 103(a) (Supp. I 1995). Defendant-appellee, the United States and third-party defendant/cross-appellant, SDL, Inc.<sup>1</sup> (collectively, "Defendants") assert that the trial court's

summary judgment that the claimed inventions of the '098 patent would have been obvious should be affirmed, and SDL cross-appeals the trial court's holding that genuine issues of material fact prevented a determination on summary judgment of anticipation under 35 U.S.C. § 102, asserting that the claimed inventions of the '098 patent also should have been found invalid as anticipated.

This appeal was submitted for our decision following oral argument on March 3, 1998. We have jurisdiction over a final decision of the Court of Federal Claims pursuant to 28 U.S.C. § 1295(a)(3) (1994). Because the Court of Federal Claims erred in holding on summary judgment that the inventions of the '098 patent would have been obvious, we vacate that portion of the decision and remand the case for further proceedings. On the cross-appeal, we affirm the decision of the Court of Federal Claims that genuine issues of material fact prevented summary judgment that the claims of the '098 patent were anticipated.

#### BACKGROUND

Rockwell filed suit against the United States on August 30, 1993, alleging infringement of various claims of its '098 patent and identifying sixteen government contractors alleged to have participated in the infringement.<sup>2</sup> SDL, one of those contractors, received a notice from the United States under RCFC<sup>3</sup> 14(a)(1) & (c) but initially did not appear because SDL believed that its liability as an indemnitor was not high enough. In May 1995, however, Rockwell sued SDL for infringement of the same patent in the United States District Court for the Northern District of California. In June 1995, SDL intervened in the Court of Federal Claims action as a third-party defendant, and in September 1995, the district court action was suspended pending disposition of the validity

covered by their procurement contracts. See *Rockwell Int'l Corp. v. United States*, 31 Fed. Cl. 536, 537 (1994) (decision denying motion of another contractor to quash notice under RCFC 14(a)(1) and (c) or for an extension of time).

1. SDL, Inc. is also known as Spectra Diode Labs, Inc.
2. Each of the contractors apparently had an interest in this action because their respective contracts with the United States may have obligated them to indemnify the United States should it lose a litigation as a defendant regarding items

3. Rules of the Court of Federal Claims.

ent that the claimed inven-  
 3 patent would have been  
 2 affirmed, and SDL cross-  
 court's holding that genuine  
 1 fact prevented a determi-  
 ny judgment of anticipation  
 § 102, asserting that the  
 s of the '098 patent also  
 found invalid as anticipat-

submitted for our decision  
 ument on March 3, 1998.  
 ion over a final decision of  
 eral Claims pursuant to 28  
 3) (1994). Because the  
 Claims erred in holding on  
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 ould have been obvious, we  
 a of the decision and re-  
 further proceedings. On  
 ve affirm the decision of  
 eral Claims that genuine  
 fact prevented summary  
 claims of the '098 patent

#### BACKGROUND

suit against the United  
 0, 1993, alleging infringe-  
 ms of its '098 patent and  
 government contractors  
 icipated in the infringe-  
 of those contractors, re-  
 the United States under  
 (c) but initially did not  
 believed that its liability  
 as not high enough. In

Rockwell sued SDL for  
 same patent in the Unit-  
 Court for the Northern  
 a. In June 1995, SDL  
 court of Federal Claims  
 arty defendant, and in  
 district court action was  
 disposition of the validity

urement contracts. See  
 . *United States*, 31 Fed. Cl.  
 sion denying motion of an-  
 quash notice under RCFC  
 (or an extension of time).

f Federal Claims.

issues in the action pending in the Court of  
 Federal Claims.

Prior to SDL's intervention, Rockwell and  
 the United States had obtained a scheduling  
 order that trial would proceed in phases  
 based on categories of accused infringing  
 equipment as follows: (1) night vision equip-  
 ment; (2) photo voltaic cells; and (3) laser  
 diodes in semiconductor devices. Claim con-  
 struction and validity were to be decided in  
 phase 1 and applied to all three phases. This  
 appeal and cross-appeal relate to whether  
 the '098 patent is invalid.

The '098 patent claims a process called  
 MOCVD<sup>4</sup> for growing Group III/V semicon-  
 ductor materials. Chemical vapor deposition  
 ("CVD") is a process for depositing a thin  
 film of material onto a substrate by reacting  
 the constituent elements in gaseous phase.  
 CVD processes are used to produce thin,  
 single crystal films called epitaxial films.  
 Prior to the invention of the '098 patent,  
 other CVD processes had been used to grow  
 similar Group III/V semiconductor films.

The '098 patent identifies specific groups  
 of reactants to be used in CVD processes.  
 The reactant supplying the Group III ele-  
 ment is to be an organometallic alkyl, and  
 the Group V reactant is to be a hydride or a  
 halide-free alkyl compound. Dr. Harold M.  
 Manasevit first filed his patent application on  
 the MOCVD process on February 13, 1968.  
 After numerous continuations and continua-  
 tions-in-part, the application issued as  
 the '098 patent on January 11, 1983.

In phase 1 of the litigation, Rockwell as-  
 serted infringement of at least independent  
 claims 1, 2, and 3. Defendants asserted that  
 claims 1, 2, and 3 are invalid under sections  
 102, 103, and 112 of Title 35. SDL further  
 asserted invalidity for failure to claim statu-  
 tory subject matter under section 101.  
 Rockwell filed a motion for summary judg-  
 ment that claims 1 and 3 were not invalid,

which was denied. Defendants filed motions  
 for summary judgment of anticipation, which  
 were denied, and of obviousness, which were  
 granted.

The trial court held that because neither  
 Rockwell's own motion for summary judg-  
 ment that claims 1 and 3 are not invalid nor  
 its consolidated opposition to Defendants'  
 motions urging the invalidity of claims 1, 2, 3,  
 11, 35, 40, 44, 50, 55-58, 66, and 72 separately  
 defended independent claim 2 or any of the  
 other claims of the '098 patent, claim 2 and  
 all of the other claims stand or fall with the  
 decision on claims 1 and 3. See *id.* at 492; see  
 also *Rockwell Int'l Corp. v. United States*, 37  
 Fed.Cl. 478, 481-82 (1997) (order denying  
 Rockwell's motion for reconsideration).<sup>5</sup>

The trial court found that during prosecu-  
 tion, the claims of the '098 patent were lim-  
 ited to a CVD process using a cold-wall re-  
 actor. *Rockwell*, 37 Fed. Cl. at 485. In  
 making its obviousness determination, the  
 trial court found that every limitation in the  
 process claimed in independent claims 1 and  
 3 was recited in four prior art patents "or  
 elsewhere in the CVD prior art." *Id.* at  
 496. The trial court therefore found that all  
 of the asserted claims were invalid under  
 section 103(a). Rockwell timely appealed to  
 this court.

#### DISCUSSION

[1] Summary judgment is appropriate  
 where "there is no genuine issue as to any  
 material fact and . . . the moving party is  
 entitled to a judgment as a matter of law."  
 RCFC 56(c). In determining the propriety  
 of summary judgment, credibility determina-  
 tions may not be made, and the evidence  
 must be viewed favorably to the nonmovant,  
 with doubts resolved and reasonable infer-  
 ences drawn in the nonmovant's favor. See  
*SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d

4. MOCVD: Metal-organic chemical vapor depo-  
 sition. A technique for growing thin layers of  
 compound semiconductors in which metal or-  
 ganic compounds, having the formula MR<sub>x</sub>,  
 where M is a Group III metal and R is an  
 organic radical, are decomposed near the surface  
 of a heated substrate wafer, in the presence of a  
 hydride of Group V element. *McGraw-Hill Dic-  
 tionary of Scientific and Technical Terms* 1250  
 (5th ed. 1994).

5. In its appeal, Rockwell challenges the trial  
 court's disposal of all of the claims of the '098  
 patent. Because we vacate and remand the trial  
 court's summary judgment of obviousness on the  
 asserted claims, we need not address whether all  
 of the claims of the '098 patent stand or fall with  
 the asserted ones.

1107, 1116, 227 USPQ 577, 581-82 (Fed.Cir. 1985) (in banc).

[2, 3] "[I]n rendering a decision on a motion for summary judgment, a court must 'view the evidence presented through the prism of the substantive evidentiary burden' that would inhere at trial." *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 880, 45 U.S.P.Q.2d 1977, 1981 (Fed. Cir.1998) (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 254, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986)). The moving party "bears the burden of demonstrating the absence of genuine issues of material fact." *Conroy v. Reebok Int'l, Ltd.*, 14 F.3d 1570, 1575, 29 U.S.P.Q.2d 1372, 1377 (Fed.Cir. 1994). We review *de novo* the trial court's grant of summary judgment. See *Celotex Corp. v. Catrett*, 477 U.S. 317, 323, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986); *Conroy*, 14 F.3d at 1575, 29 USPQ2d at 1377. The underlying determination of invalidity, however, must be predicated on facts established by clear and convincing evidence. See *National Presto Indus. v. West Bend Co.*, 76 F.3d 1184, 1189, 37 U.S.P.Q.2d 1685, 1687 (Fed.Cir.1996).

[4, 5] Obviousness is a question of law based on underlying factual determinations. See *Richardson-Vicks, Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479, 44 U.S.P.Q.2d 1181, 1183 (Fed.Cir.1997). These underlying determinations include: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) the extent of any proffered objective indicia of nonobviousness, sometimes termed secondary considerations. See *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). In reviewing a summary judgment determination of obviousness, therefore, this court first determines anew whether the record raises any genuine issues of material fact. See *Monarch*, 139 F.3d at 881, 45 U.S.P.Q.2d at 1981. "If facts

remain in dispute, this court weighs the materiality of the dispute, i.e., whether resolution of the dispute one way or the other makes a difference to the final determination of obviousness." *Id.*

## I. Claim Construction

[6] The first step in any invalidity or infringement analysis is claim construction. See *Beachcombers v. WildeWood Creative Prods., Inc.*, 31 F.3d 1154, 1160, 31 U.S.P.Q.2d 1653, 1660 (Fed.Cir.1994). Claim construction is a question of law, reviewed *de novo* on appeal. See *Cybor Corp. v. FASStar Ltd.*, 138 F.3d 1448, 1454, 46 U.S.P.Q.2d 1169, 1173 (Fed.Cir.1998) (in banc).

[7] The trial court first determined that the preambles of independent claims 1 through 3 operated as claim limitations.<sup>6</sup> See *Rockwell*, 37 Fed. Cl. at 488. The trial court found:

If the preamble language is not used, there would be no claim limitations regarding the growing of epitaxial films or the type of substrate used in the process. The patent when read in its entirety reads toward the process of the growth of a particular type of film, Group III-V semiconductor, and a certain process for doing that very growth.

*Id.* The patent's written description repeatedly discloses that it is directed to a process for producing an epitaxial film of a Group III/V semiconductor. See, e.g., '098 patent, col. 1, ll. 18; col. 2, ll. 56-57; col. 3, ll. 51-52; col. 4, ll. 46-47; col. 5, ll. 29-31; col. 8, ll. 13-14; col. 10, ll. 42-43. Similar language is contained in the preambles. "When the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects." *Bell Communications Research, Inc. v. Vitalink Communications*

introducing into said open reactor a fist [sic] material containing a hydride or halide-free alkyl compound of at least one Group V constituent of said semiconductor, and, as a second material, at least one halide-free alkyl compound containing at least one of the Group III constituents of said semiconductor, and exhausting said open reactor to pressure not greater than one atmosphere.

6. Independent claim 1 is representative for purposes of this appeal and is reproduced below:

1. An organo-metallic process for producing an epitaxial film of Group III-V semiconductor disposed on a single crystal substrate, said process employing an open reactor and comprising the steps of:

heating said substrate in said open reactor,

ite, this court weighs the material dispute, i.e., whether resolution one way or the other leads to the final determination. *Id.*

#### Construction

At step in any invalidity or analysis is claim construction. *See In re WildeWood Creative*, 31 F.3d 1154, 1160, 31 Fed. Cl. 1660 (Fed.Cir.1994). Claim construction is a question of law, reviewed *de novo*. *See Cybor Corp. v. FASStar*, 144 F.3d 1448, 1454, 46 U.S.P.Q.2d 1000 (Fed.Cir.1998) (in banc).

The court first determined that the claims were independent claims limited as claim limitations.<sup>6</sup> *See In re* Cl. at 488. The trial court

because the language is not used, there are no claim limitations regarding epitaxial films or the type of process used in the process. The language read in its entirety reads "a process of the growth of a film of Group III-V semiconductor on a substrate by a certain process for doing so."

The written description requires that it is directed to a process of growing an epitaxial film of a semiconductor. *See, e.g., '098 Patent*, col. 2, ll. 56-57; col. 3, ll. 16-17; col. 5, ll. 29-31; col. 10, ll. 42-43. Similar language is found in the preambles. "When one chooses to use both the body to define the subject matter of the invention, the invention is the one the *Bell Communications Revitalink Communications*

to said open reactor a first [sic] using a hydride or halide-free of at least one Group V semiconductor, and, as a second, at least one halide-free alkylating at least one of the Group of said semiconductor, and an open reactor to pressure not atmosphere.

*Corp.*, 55 F.3d 615, 620, 34 U.S.P.Q.2d 1816, 1820 (Fed.Cir.1995); *see also In re Paulsen*, 30 F.3d 1475, 1479, 31 U.S.P.Q.2d 1671, 1673 (Fed.Cir.1994) ("[T]erms appearing in a preamble may be deemed limitations of a claim when they give meaning to the claim and properly define the invention.").

The trial court further interpreted the independent claims as reflecting a narrowing of the claim scope during prosecution, concluding that the claimed "open reactor" must be an "open cold-wall reactor." *Rockwell*, 37 Fed. Cl. at 490. The trial court found that "Dr. Manasevit meant to limit his invention/process to the use of cold-wall reactor. He had to in order to avoid obviousness under the Ruehrwein patents." *Id.* None of the parties challenges this construction by the trial court. We agree that the claims of the '098 patent were limited during prosecution by Dr. Manasevit to an open cold-wall reactor. For example, in response to the third Office action rejecting the claim that would become claim 1, Dr. Manasevit asserted that "[b]y contrast [to the Ruehrwein patent], the present process discloses the use of a 'cold wall' process." *Id.* at 489.

[8] Although the parties agree that the claims are limited to cold-wall reactors, SDL contends that the trial court improperly adopted the definition of cold-wall reactor asserted by Rockwell instead of the definition asserted by SDL. In response to the third Office action rejection based on Ruehrwein, Dr. Manasevit referenced "the article by Stringfellow et al., supra, at pages 50 and 54 which discuss[es] and distinguish[es] cold wall versus hot wall apparatus and related organometallic processes."<sup>7</sup> In that article, the authors defined a cold-wall system as one "where only the graphite pedestal is heated (by rf induction heating) and the SiO walls remain cool even though no special water or forced air cooling is employed." *Id.* at 490. The trial court held that Dr. Manasevit incorporated the definition of cold-wall reactor from the Stringfellow et al., article. *Id.* The trial court thus defined a cold-wall reactor as one in which heat is applied at the substrate and the walls are kept significantly cooler than the substrate.

7. The inventor was citing G.B. Stringfellow and

SDL agrees that the Stringfellow article was an appropriate place to find the definition of cold-wall reactor. However, SDL asserts that the definition adopted by the trial court misreads the article and that the definition supplied by its expert, the same Dr. Stringfellow, should be adopted. According to SDL, Dr. Stringfellow's summary, in his declaration, of the statements made in his article lead to the following definition of a cold-wall reactor: "a reactor in which the walls of the reaction chamber are kept cool enough to avoid significant pyrolysis of the reactants on or near the walls of the reactor." Declaration of Gerald B. Stringfellow, Ph.D., in support of the Cross-Motion of SDL, Inc. for Summary Judgment and Response to Motion for Summary Judgment by Rockwell, pp. 17-20 (May 2, 1996). Thus, SDL asserts that not only must a cold-wall reactor's walls be significantly cooler than the substrate, but also be cool enough that no significant pyrolysis occurs on or near the walls.

We agree, however, with the trial court's analysis of the definition of cold-wall reactor. As the trial court noted, although SDL is correct that "a cold-wall reactor may have significantly less pyrolysis on the walls of the chamber than the hot-wall reactor, [that] is the reason to use a cold-wall reactor and not the meaning of a cold-wall reactor." 37 Fed. Cl. at 490. Furthermore, the article does not indicate that pyrolysis cannot occur near the walls of a cold-wall reactor. Rather, it indicates that the whole point of a cold-wall system is to get the substrate much hotter than the reactor walls. We therefore hold that the definition of cold-wall reactor adopted by the trial court is correct.

#### II. Anticipation

[9, 10] Anticipation under 35 U.S.C. § 102 requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention. *See Electro Med. Sys. S.A. v. Cooper Life Sciences*, 34 F.3d 1048, 1052, 32 U.S.P.Q.2d 1017, 1019 (Fed. Cir.1994). Whether such art is anticipating is a question of fact. *See Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d

H.T. Hall, 43 J. Crystal Growth 47 (1978).



1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir.1991).

The four prior art patents analyzed by the trial court for both its anticipation and its obviousness determinations were: U.S. Pat. No. 3,266,270 (the "Miederer Patent"), U.K. Pat. No. 778,383 (the "Scott Patent"), U.S. Pat. No. 3,364,084 and U.K. Pat. No. 1,011,979 (the "Ruehrwein Patents"). (The only patent in this group that was cited as a reference during the prosecution of the '098 patent was the U.S. Ruehrwein patent.)

[11] The trial court determined that genuine issues of material fact remained concerning what was disclosed in the prior art cited by Defendants. *Rockwell*, 37 Fed. Cl. at 503-05. Specifically, the trial court concluded that "[m]aterial issues of fact in dispute preclude summary disposition of whether the works of Drs. Stearns and Thomas qualify as prior art under section 102(g)." <sup>8</sup> *Id.* at 503. Further, the trial court determined:

The question of whether the Miederer patent contains the single crystal substrate element is a dispute of fact that is material.

... The question of whether the terms of Miederer patent provides a[sic] sufficient basic chemistry information to enable one skilled in the art to achieve epitaxial single crystalline semiconductors, presents a material issue of fact that needs to be clarified with further ventilation through expert testimony.

*Id.* at 504-05. In addition, the trial court held that "[t]here is a genuine dispute of material fact as to whether the [Scott] patent terms provide sufficient basic chemistry information to enable one skilled in the art to grow epitaxial single crystalline semiconductors." *Id.* at 505. Finally, the trial court determined that "[t]he information in the summary judgment papers is not sufficient to resolve the differences in expert opinion" as to whether the Ruehrwein patents taught single crystal growth using organometallics.

8. Defendants assert that the works of Drs. Stearns and Thomas are prior art, but the trial court found that it was unclear on the summary judgment record if Drs. Stearns and Thomas reduced the invention to practice prior to February 7, 1967, the date of reduction to practice of the invention claimed in the '098 patent. The

*Id.* Hence, of the four prior art patents cited by Defendants, the trial court did not find that any one taught single crystal growth of a Group III/V semiconductor using organometallics. Defendants have not shown that the trial court erred in identifying these genuine issues of material fact. Nor on appeal have Defendants indisputably shown that any of the four patents teaches such single crystal growth of Group III/V semiconductors. The trial court's determination, therefore, that there is a genuine dispute of material fact as to whether any of the four prior art references relied upon by Defendants taught a successful process for the growth of an epitaxial film using organometallics is affirmed.

### III. Obviousness

[12, 13] Under 35 U.S.C. § 103(a),

[a] patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

In determining obviousness, the invention must be considered as a whole without the benefit of hindsight, and the claims must be considered in their entirety. *See W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1551, 220 U.S.P.Q. 303, 312-13 (Fed.Cir.1983); *see also Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1567, 220 U.S.P.Q. 97, 101 (Fed.Cir.1983). Throughout the obviousness determination, a patent retains its statutory presumption of validity. *see* 35 U.S.C. § 282, and the movant retains the burden to show the invalidity of the claims by clear and convincing evidence as to underlying facts. *see Glaverbel Societe Anonyme v. Northlake Mktg. & Supply, Inc.*, 45 F.3d 1550, 1555, 33 U.S.P.Q.2d 1496, 1499 (Fed.Cir.1995); *Ryko Mfg. Co. v. Nu-Star*.

trial court does not appear to have used these works in its anticipation analysis, but to the extent that the trial court used these teachings on summary judgment either of anticipation or of obviousness, it erred because of its finding that a genuine issue of material fact existed regarding reduction to practice.

four prior art patents cited the trial court did not find a single crystal growth of semiconductor using organometallic reagents. Defendants have not shown that the trial court erred in identifying these as material facts. Nor on appeal are the defendants indisputably shown that the four patents teach such growth of Group III/V semiconductor. The trial court's determination that there is a genuine dispute of material fact as to whether any of the four patents relied upon by Defendants is a successful process for the growth of a single crystal film using organometallic reagents is not

35 U.S.C. § 103(a), which requires that the invention not be obtained ... if the subject matter was anticipated and the prior art was so obvious at the time the invention was made to a person having ordinary skill in the art to which said invention pertains.

obviousness, the invention must be considered as a whole without the aid of hindsight, and the claims must be construed in their entirety. See *W.L. Gore & Associates, Inc. v. Gore*, 721 F.2d 1540, 1549, 303 F.3d 312-13 (Fed. Cir. 1998). *Edtron, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1567, 220 F.3d 1312 (Fed. Cir. 1998). Throughout the trial, the trial court's determination, a patent presumption of validity, and the movant retains the burden of proving the invalidity of the patent by a preponderance of the convincing evidence as to the patent. See *Glaverbel Societe Anonyme v. Mfg. Co. v. Nu-Star*, 1999 U.S.P.Q.2d 1496, 1499 (Fed. Cir. 1999).

appear to have used these teachings in its analysis, but to the trial court used these teachings on either of anticipation or of obviousness because of its finding that a material fact existed regarding

*Inc.*, 950 F.2d 714, 716, 21 U.S.P.Q.2d 1053, 1055 (Fed. Cir. 1991).

#### A. Genuine Issues About the Content of the Prior Art Precluded a Determination of Obviousness on Summary Judgment

[14] After determining that genuine issues of material fact existed with respect to the prior art cited to prove anticipation, the trial court nevertheless accepted the assertions of Defendants as to the content of the same prior art patents for its obviousness analysis. From these assertions, it found that each limitation of the process claimed in the '098 patent "is taught by the combination of the Miederer, Scott and Ruehrwein patents, or elsewhere in the CVD prior art." *Rockwell*, 37 Fed. Cl. at 496.

[15] Before the trial court and on appeal, Rockwell disputes this determination, contending that Defendants' obviousness challenge "does not include 'a single piece of prior art reporting the growth of gallium arsenide (or any other III/V semiconductor) single crystals using organometallic reagents,'" *id.*, the same limitation whose presence in the prior art the trial court found materially disputed. That prior art patents may have described failed attempts<sup>9</sup> or attempts that used different elements<sup>10</sup> is not enough. The prior art must be enabling.<sup>11</sup> See *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1471, 43 U.S.P.Q.2d 1481, 1489 (Fed. Cir. 1997) ("In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the

art to make and use the apparatus or method." (quoting *Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 U.S.P.Q.2d 1301, 1304 (Fed. Cir. 1989))). Because none of the four patents alone taught this limitation, Defendants had the burden to prove that combining these references would suggest to one of ordinary skill in the art how to perform the missing process step with a reasonable likelihood of success. See *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); cf. *Miles Lab., Inc. v. Shandon, Inc.*, 997 F.2d 870, 878, 27 U.S.P.Q.2d 1123, 1128-29 (Fed. Cir. 1993) ("The differences between the prior art and [the patent claim] were minor and achievable by simple modification. Moreover, the prior art references collectively suggest the engineering necessary to achieve these modifications."). Defendants did not show the trial court any prior art patent or combination of prior art patents that taught with a reasonable likelihood of success how to grow a single crystal film of Group III/V semiconductor material on a substrate using organometallic reagents.

#### B. Inferences May Not Be Drawn Against the Nonmovant on Summary Judgment

##### 1. The Trial Court Cannot Infer that One of Ordinary Skill in the Art Would Have Known How to Achieve Epitaxial Growth

[16] Rockwell argues that the lack of any teaching in the prior art that single crystal

9. For example, the trial court found that the Miederer patent taught the use of alkyl gallium along with AsCl<sub>3</sub> to deposit a GaAs layer on a semiconductor rod substrate, but the trial court also found a material issue of fact as to whether one could grow epitaxial layers by following the procedure disclosed in Miederer. In fact, there was evidence by the inventor himself that the example in his patent did not accomplish epitaxial growth: "I did not accomplish my ultimate goal of growing a single crystal film of gallium arsenide; rather, the film I grew was polycrystalline." Although the inventor further stated that his "inability to grow epitaxial layers was not the result of any deficiency in the process ... but rather the result of the inadequacy of the facilities available ...," there were differences between the failed Miederer process and the successful one disclosed in the '098 patent that also may have contributed to that failure.

10. For example, the trial court found that there was a genuine issue of material fact as to whether the Ruehrwein patents specifically disclosed Group III alkyls in combination with alkyls or hydrides of Group V. Furthermore, the trial court found that "SDL's expert in his deposition stated that organometallic [pyrolysis] in a hot wall chamber would not create single crystalline epitaxy." *Rockwell*, 37 Fed. Cl. at 505.

11. The district court found a disputed issue of fact with respect to the enablement of epitaxial layer growth using the Scott patent. Rockwell's expert asserted that Scott would not enable a knowledgeable person to produce epitaxial film no matter what the operator's skill, but SDL's expert asserted otherwise.



films of III/V semiconductor materials may *successfully be grown* is dispositive as to obviousness. The trial court held, however, that "[o]bviousness standards under section 103 do not require such a showing. Invalidity for obviousness requires a showing that the prior art viewed as a whole would have suggested the claimed process to one skilled in the art." *Rockwell*, 37 Fed. Cl. at 496. By assuming and not determining whether any prior art reference taught or suggested the process steps for successful growth of a single crystal film, the trial court drew an inference against the nonmovant, Rockwell. However, on summary judgment, the evidence must be viewed favorably to the nonmovant, with doubts resolved and reasonable inferences drawn in the nonmovant's favor. See *SRI Int'l*, 775 F.2d at 1116, 227 U.S.P.Q. at 581-82.

The trial court had earlier determined with respect to anticipation that none of the prior art patents taught single crystal growth of Group III/V semiconductors using organometallics. Therefore, with respect to obviousness, the trial court could not simply find that these four patents, when combined with each other and unidentified "other CVD prior art," taught the very limitation that admittedly none of them taught separately. Such a determination required the assumption or inference against Rockwell, the nonmovant, that somewhere in some prior art single crystal growth of Group III/V semiconductors was taught, and one of ordinary skill in the art would have known. Although there may be cases when the addition of the missing limitation would be clear to anyone looking at the problem, this is not one of those cases.

[17] Single crystal growth of a Group III/V semiconductor using an organometallic reagent is a specific limitation of the claims of the '098 patent. The trial court's determination, therefore, that "[t]he Obviousness Claims Charts show that Miederer, Scott and Ruehrwein patents, when combined contain all of the elements included in claims 1 and 3 of the '098 patent," *id.* at 497, is not legally sufficient. It cannot support the conclusion that all of the claims in the '098 patent are invalid for obviousness on the summary judgment record because doing so requires drawing of an adverse inference. Rather "[t]he

consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success." *Dow*, 837 F.2d at 473, 5 U.S.P.Q.2d at 1531; see also *United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1564, 41 U.S.P.Q.2d 1225, 1233 (Fed.Cir.1997). On the summary judgment record before this court, Defendants have not pointed specifically to any such suggestion.

We agree with the trial court that assessing the prior art patents involved material factual issues genuinely in dispute, precluding summary judgment of anticipation. We must take the next step, however, and hold that these material issues also precluded a conclusion of obviousness on summary judgment. Because of the presence of genuine issues of material fact regarding whether on this record the prior art patents taught a successful process for epitaxial growth of Group III/V semiconductors using organometallics, Defendants have not proven by clear and convincing evidence that the invention defined in the claims of the '098 patent would have been obvious to one of ordinary skill in the art and that therefore they are entitled to judgment. We hold, on this record, that the Court of Federal Claims legally erred in determining on summary judgment that the claimed invention would have been obvious.

**2. Inferences Adverse to the Nonmovant Regarding Secondary Considerations of Nonobviousness Are Also Impermissible on Summary Judgment**

[18] Evidence of secondary considerations is but a part of the "totality of the evidence" that is used to reach the ultimate conclusion of obviousness. See *Richardson-Vicks*, 122 F.3d at 1483, 44 U.S.P.Q.2d at 1187 (citing *Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1151, 219 U.S.P.Q. 857, 862 (Fed. Cir.1983)). In some cases this evidence is the most probative of obviousness, but its existence or non-existence does not control the obviousness determination. See *id.* Because we hold that genuine issues of material fact relating to the first three *Graham* factors preclude determination of obviousness

tion for determination of obviousness. Whether the prior art would have been obvious to a person of ordinary skill in the art should be carried out and reasonable likelihood of success. 7 F.2d at 473, 5 U.S.P.Q.2d at 103, 103 F.3d 1554, 1564, 41 F.3d 1233 (Fed.Cir.1997). On summary judgment record before this court, the evidence has not pointed specifically to anticipation.

At the trial court that assessed the patents involved material issues in dispute, preclusion of anticipation. We next step, however, and hold that the trial issues also precluded a finding of obviousness on summary judgment. The presence of genuine issues of material fact regarding whether on summary judgment prior art patents taught a person of ordinary skill in the art for epitaxial growth of conductors using organometallic compounds have not proven by clear evidence that the invention was obvious to one of ordinary skill in the art. Therefore they are entitled to a new trial. On this record, that the Federal Claims legally erred in summary judgment that the invention would have been obvious.

#### Obviousness to the Nonmovant: Secondary Considerations and Obviousness Are Also Impermissible on Summary Judgment

The evidence of secondary considerations of the "totality of the evidence" used to reach the ultimate conclusion of obviousness. See *Richardson-Vicks, Inc. v. Jack, Inc.*, 719 F.2d 1483, 44 U.S.P.Q.2d at 19, 19 U.S.P.Q. 857, 862 (Fed. Cir. 1984). In these cases this evidence is evidence of obviousness, but its existence does not control summary judgment. See *id.* Genuine issues of material fact. The first three *Graham* factors for determination of obviousness

on summary judgment, we need not ascertain whether these secondary considerations are determinative of nonobviousness here. The trial court held that Rockwell had not shown how any of the secondary considerations were the result of the merits of the claimed invention. We again note, however, that in resolving a summary judgment motion inferences may not be drawn against the nonmovant and adverse credibility determinations may not be made. See *SRI Int'l*, 775 F.2d at 1116, 227 U.S.P.Q. at 581-82. Further, Rockwell did present its own evidence of secondary considerations based upon which a reasonable inference could be drawn in favor of nonobviousness. After further development of the evidence, the trial court may be able properly to determine in which direction these relevant indicia push and whether they would change what otherwise would be the decision of obviousness *vel non*.

#### CONCLUSION

The decision that Defendants had not proven anticipation so as to support a grant of summary judgment is affirmed. Further, the evidence in the summary judgment record raises genuine issues of material fact concerning the obviousness determination. Accordingly, the summary judgment of the Court of Federal Claims holding the '098 patent invalid for obviousness is vacated and the case is remanded for further proceedings on obviousness, anticipation and any other issues necessary to conclude the lawsuit.

**AFFIRMED-IN-PART, VACATED-IN-PART, and REMANDED-IN-PART.**

#### COSTS

Each party shall bear its own costs.



**Janice R. LACHANCE, Director, Office of Personnel Management, Petitioner,**

**v.**

**MERIT SYSTEMS PROTECTION BOARD, Respondent.**

**No. 97-3450.**

United States Court of Appeals,  
Federal Circuit.

June 24, 1998.

Supervisory police officer in the Security Division of the United States Mint appealed agency's decision to demote him on charges of violating agency security procedures and unacceptable and inappropriate behavior by a supervisor. The administrative judge sustained only the first charge and mitigated the penalty. Agency petitioned for review. The Merit Systems Protection Board, affirmed initial decision as modified, 70 M.S.P.R. 623, and reconsideration was denied, 75 M.S.P.R. 57. The Office of Personnel Management (OPM) petitioned for judicial review. The United States Court of Appeals for the Federal Circuit, Bryson, Circuit Judge, held that specification accompanying charge of "unacceptable and inappropriate behavior by a supervisor" did not necessarily require agency to prove that police officer intended to impede agency's investigation of his alleged earlier misconduct, since agency set forth two alternative characterizations of charge.

Reversed and remanded.

#### 1. Officers and Public Employees § 72.41(1)

Federal employee's death did not moot Office of Personnel Management's (OPM) petition for judicial review of Merit Systems Protection Board (MSPB) decision; OPM may appeal from MSPB decisions even when employee has no continuing interest in dispute that gave rise to OPM's appeal, and, in any event, disposition of case could have effect on back pay or other benefits payable to employee's estate.

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